

What is claimed is:

1. A multi-directional pump, comprising:
 - a housing having an inlet port and an outlet port;
 - a pumping device disposed in said housing;
 - a first fluid chamber in fluid communication with the inlet port for receiving fluid when said pumping device is moved toward a first position;
 - a second fluid chamber in direct fluid communication with the outlet port;
 - a first conduit by which fluid in said first fluid chamber is communicable to said second fluid chamber when said pumping device is moved toward a second position; and
 - a second conduit by which fluid in said first fluid chamber is directly communicable to the outlet port.
2. The pump of claim 1, wherein:
 - said housing includes a piston channel; and
 - said pumping device comprises a piston disposed in said piston channel.
3. The pump of claim 2, wherein said piston includes:
 - a first face at least partially defining said first fluid chamber such that said first face exerts a force on fluid in said first fluid chamber when said piston is moved toward the second position; and
 - a second face at least partially defining said second fluid chamber such that said second face exerts a force on fluid in said second fluid chamber when said piston is moved toward the first position.
4. The pump of claim 1, wherein said housing at least partially encloses a drive shaft chamber, further comprising an oil seal positioned between the

drive shaft chamber and the piston channel to restrict the communication of oil thereto.

5. The pump of claim 1, further comprising a water jacket mountable on said housing.

6. The pump of claim 1, wherein said second fluid chamber is in direct fluid communication with the inlet port.

7. The pump of claim 1, wherein said first fluid chamber has a passage by which fluid is communicable from the inlet port to said first fluid chamber and by which fluid is communicable from said first fluid chamber to said second fluid chamber.

8. The pump of claim 1, wherein said first fluid chamber includes:

an inlet by which fluid is communicable from the inlet port to said first fluid chamber; and

an outlet by which fluid is communicable from said first fluid chamber to said second fluid chamber.

9. The pump of claim 1, further comprising a sealing mechanism for sealing said first conduit.

10. The pump of claim 9, further comprising an actuator for causing said sealing mechanism to seal said first conduit.

11. The pump of claim 10, wherein said actuator is configured to activate said sealing mechanism when the required amount of compressed fluid falls below a threshold value.

12. The pump of claim 11, wherein said actuator is an electronic control unit.

13. The pump of claim 9, wherein said sealing mechanism comprises a directional-control valve.

14. The pump of claim 9, wherein:

said first fluid chamber has a passage for receiving and discharging fluid therefrom;

said sealing mechanism is located at the passage of said first fluid chamber; and

said first fluid chamber is in fluid communication with said second fluid chamber when said sealing mechanism is in an unactivated position

15. The pump of claim 14, wherein said second fluid chamber is not in fluid communication with said first fluid chamber when said sealing mechanism is in a double-acting position.

16. The pump of claim 14, wherein said second fluid chamber is not in fluid communication with said first fluid chamber or the inlet port when said sealing mechanism is in a single-acting position.

17. The pump of claim 9, further comprising a second sealing mechanism for sealing said second conduit.

18. The pump of claim 17, further comprising an actuator for causing said second sealing mechanism to seal said second conduit.

19. The pump of claim 18, wherein said actuator is configured to activate said second sealing mechanism when the required amount of compressed fluid rises above a threshold value.

20. The pump of claim 17, wherein:

said first fluid chamber is in direct fluid communication with the outlet port when said second sealing mechanism is in an activated position; and

said first fluid chamber is not in direct fluid communication with the outlet port when said second sealing mechanism is in a two-stage position.

21. The pump of claim 9, wherein said sealing mechanism comprises a wall member disposable between first and second locations along said first conduit.

22. The pump of claim 21, wherein:
said housing includes cylinder; and
said wall member comprises a plate mountable to said cylinder.
23. The pump of claim 1, further comprising a sealing mechanism for sealing said second conduit.
24. The pump of claim 23, further comprising an actuator for causing said sealing mechanism to seal said second conduit.
25. The pump of claim 24, wherein said actuator is configured to activate said sealing mechanism when the required amount of compressed fluid rises above a threshold value.
26. The pump of claim 23, wherein:
said first fluid chamber is in direct fluid communication with the outlet port when said sealing mechanism is in an activated position; and
said first fluid chamber is not in direct fluid communication with the outlet port when said sealing mechanism is in a two-stage position.
27. A multi-directional pump, comprising:
a housing having an inlet port and an outlet port;
a pumping device disposed in said housing;
a first fluid chamber in fluid communication with the inlet port for receiving fluid when said pumping device is moved toward a first position;
a second fluid chamber;
a conduit by which fluid in said first fluid chamber is communicable to said second fluid chamber when said pumping device is moved toward a second position; and
wherein said first and second fluid chambers are in direct fluid communication with the outlet port.

28. A method of compressing fluid with a pump having an outlet, the method comprising the steps of:

urging fluid into the pump;

compressing the fluid in a first compression area;

urging a first volume of the compressed fluid through the outlet and a second volume of the compressed fluid to a second compression area;

further compressing the second volume of the compressed fluid;

urging the further compressed fluid through the outlet.

29. The method of claim 28, wherein:

the step of compressing the fluid in the first compression area occurs when a piston is moved towards a first position; and

the step of compressing the fluid in the second compression area occurs when a piston is moved towards a second position.